

### REMARKS

The Examiner placed a restriction requirement on the subject application listing as invention I, Claims 1 - 11 and invention II, Claims 12 - 20. Applicants elected invention I, Claims 1 - 11 and Claims 12 - 20 are withdrawn from further consideration.

The Examiner rejected Claims 1-6 and 8 under 35 U.S.C. 103(a) as being unpatentable over Miller et al. in view of Keller et al. Claim 7 was rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. in view of Keller et al. as evidenced by Tomczuk et al. Finally, the Examiner rejected Claims 9-10 under 35 U.S.C. 103(a) as being unpatentable over Miller et al. in view of Keller et al. and further in view of Boutin et al.

The Examiner objected to Claim 11 as being dependent upon a rejected base claim but indicated that it would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 1 is the base independent claim, and for Claim 11, Claim 8 is the intervening dependent claim which is dependent on Claim 1. Thus, Claim 11 would become an independent base claim by incorporating all of the claimed steps of method Claim 1 and the limitations of Claims 8 and 11, as originally filed. Applicants have complied with these requirements by amending the original Claim 1 to incorporate the limitations of Claim 8 and Claim 11, and then canceling the original Claims 8 and 11. Claim 9 was, also, amended to read on amended Claim 1 instead of the original Claim 8.

### CONCLUSION

Since Applicants have amended the base Claim 1 to meet the Examiners objections for allowance and since all of the remaining dependent claims read on an allowable base claim, except for Claims 8 and 11 which were canceled, Applicants respectfully request that the Examiner allow Claim 1 as amended and Claims 2-7, 9 as amended, and 10, as indicated in the attached complete listing of claims.

Respectfully submitted,

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Attachments

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COMPLETE LISTING OF CLAIMS, INCORPORATING AMENDMENTS  
IN RESPONSE TO OFFICE ACTION DATED 09/05/2006  
FOR SERIAL NO. 10/761,916

1. (Currently Amended) A process for the improved electrorefining of minor actinides and transuranic elements, the process comprising:
  - a) supplying the actinides and transuranic elements in the form of spent nuclear fuel;
  - b) placing the spent fuel in an anode basket;
  - c) contacting an electrolyte containing actinide chlorides with the anode basket and a cathode;
  - d) positioning a porous barrier between the anode basket and cathode so as to form an anolyte compartment and a catholyte compartment; and
  - e) wherein said positioning of the porous barrier results in causing the concentrations of uranium ions, minor actinide ions, and transuranic ions in the catholyte compartment, or in the cathode salt, to decrease with respect to the concentrations in the anode salt which as noted causes the preferential deposition of minor actinides and transuranics at the cathode.
- 2.(Original) The process as recited in claim 1 wherein the decrease in uranium ion concentration occurs simultaneously with deposition of actinides on the cathode.
- 3.(Original) The process as recited in claim 1 wherein the barrier is permeable to actinide element ions and transuranic element ions.
- 4.(Original) The process as recited in claim 1 wherein the porous barrier isolates anode reaction products from the cathode.
- 5.(Original) The process as recited in claim 1 wherein the process further comprises the oxidation of metallic uranium and metallic transuranics at the anode.

6.(Original) The process as recited in claim 1 wherein the process further comprises the reduction of metallic uranium and metallic transuranics at the cathode.

7.(Original) The process as recited in claim 1 wherein the process further comprises an applied voltage between the anode and cathode with a range from of about 0.8 volt (V) to 1.5 V.

8.(Canceled)

9.(Currently Amended) The process as recited in claim ~~8~~ 1 wherein an increase in the thickness of the porous barrier lowers further the uranium ion concentration in the catholyte.

10.(Original) The process as recited in claim 9 wherein a decrease in the porosity of the porous barrier lowers further the uranium ion concentration in the catholyte.

11.(Canceled)

12.(Withdrawn) A device for the improved electrefining of actinides and transuranic elements from a molten salt electrolyte, the device comprising:

- a) a means for oxidizing the actinides and transuranic elements;
- b) a means for reducing the oxidized elements; and
- c) a means for controlling migration of the oxidized elements to the reducing means so as to selectively reduce the actinides.

13.(Withdrawn) The device as recited in claim 12 wherein the controlling means is a porous barrier made of a material selected from the group consisting of aluminum felt, porous aluminum nitride, porous beryllium oxide BeO.

14.(Withdrawn) The device as recited in claim 12 wherein the oxidizing means is solid uranium metal.

15.(Withdrawn) The device as recited in claim 13 wherein the porous barrier separates the

oxidizing means from the reducing means.

16.(Withdrawn) The device as recited in claim 12 wherein the controlling means allows uranium to migrate between an anolyte and a catholyte.

17.(Withdrawn) The device as recited in claim 16 wherein the controlling means causes uranium ion concentration in the catholyte to be lower than the uranium ion concentration in the anolyte.

18.(Withdrawn) The device as recited in claim 17 wherein an increase in the thickness of the porous barrier lowers further the uranium ion concentration in the catholyte.

19.(Withdrawn) The process as recited in claim 17 wherein a decrease in the porosity of the porous barrier lowers further the uranium ion concentration in the catholyte.

20.(Withdrawn) The device as recited in claim 17 wherein the porous barrier encapsulates the catholyte.